

REMARKS

This Amendment is in response to the Office Action mailed on August 24, 2010. Claims 16-24 are pending; claims 1-15 and 25-44 having been previously canceled, and claim 16 having been amended herein. Support for amended claim 16 can be found at page 1, line 29 through page 2, line 13, at page 7, line 23 through page 11, line 10, and in Figure 8. No new matter has been added. Reconsideration and allowance of the application in light of the foregoing amendments and the ensuing remarks are respectfully requested.

Rejections under 35 U.S.C. §112, ¶ 1

Examiner alleges claim 16 is based on a disclosure that is not enabling. Specifically, Examiner asserts the method step of Laguerre deconvolution to estimate the IRF at every pixel of the data is critical or essential to the practice of the invention, "but not included in the claim(s) is [sic] not enabled by the disclosure." This rejection is respectfully traversed.

Applicants respectfully submit that the method for using Laguerre deconvolution is described on page 3, line 10 through page 11, line 10 and throughout the specification, as filed, including in several examples, such as those described on page 24, line 5 through page 26, line 26. Further, Applicants submit that the disclosure, as described in the cited passages, would enable one of skill in the art to practice the invention. Therefore, Applicants respectfully request withdrawal of this rejection.

Rejections under 35 U.S.C. §112, ¶ 2

Examiner alleges claim 16 is indefinite for failing to point out and distinctly claim the subject matter which Applicants regard as the invention. This rejection is respectfully traversed. While in no way conceding to the merits of Examiner's arguments, in the interest of advancing prosecution, claim 16 has been amended according to Examiner's suggestions, rendering this objection moot with respect thereto. Therefore, Applicants respectfully request withdrawal of this rejection.

Rejections under 35 U.S.C. §103(a)

Claims 16-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Marcu et al.* in view of *Maarek, et al.* and further in view of *Siegel, et al.* Applicants respectfully traverse this rejection.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Marcu et al.* in view of *Maarek, et al.* and further in view of *Siegel, et al.* and *Reel*. Applicants respectfully traverse this rejection.

The Standard for Obviousness

The Examiner has the burden under section 103 to establish a *prima facie* case of obviousness. *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984). To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP 2143.

The claimed invention is not obvious in light of Marcu, in view of Maarek, and further in view of Siegel and Reel.

Claims 16-23 of Applicants' invention are directed to the analysis of fluorescence lifetime imaging microscopy (FLIM) data or images using the Laguerre method. Essentially, FLIM will map the "chemical" composition of a sample on a large area and then resolve this area on a pixel level. Each pixel is characterized by a fluorescence impulse response function (FIRF) and therefore lifetime maps of the sample fluorescence can be constituted. Importantly, the Laguerre method disclosed in Applicants' invention allows for a fast deconvolution FIRF from each pixel in an image. In contrast, Marcu and Maarek refer solely to time-resolved fluorescence spectroscopy (TRFS) data. There are no pixels and maps of lifetimes associated with this data. In fact, Examiner recognizes that Marcu is deficient in this capacity, indicating "Marcu does not disclose detail [sic] Laguerre expansion coefficients within the Laguerre basis; generating a map of each of the plurality of expansion coefficients; and computing a map of average lifetimes by constructing impulse response function [sic] for a predetermined number of time instances and interpolating a time point at which the IRF becomes 1/c of its maximum value, wherein the IRF is represented by the equation: $h(r,n)$."

However, Examiner argues that in the same field of endeavor, Siegel discloses fitting an exponential decay function to each image pixel and generating a FLIM map of fluorescence lifetime (see page 2998). Thus, Examiner asserts it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the methods of Marcu and Maarek with Siegel in order to arrive at the invention of the Applicants.

Applicants respectfully submit that although Siegel does teach a pixel-by-pixel analysis in the FLIM setting, it is entirely unlike Applicants' invention, in that it teaches using the stretched exponential function (StrEF) (clearly different from the Laguerre method) to describe the fluorescence decay profiles of biological tissues. Importantly, while StrEF provides a fit of the measured fluorescent decays, it appears that this approach has not been adapted to perform actual deconvolution of the excitation light pulse, as in the invention of the Applicants, as claimed.

Examiner appears to be arguing that simply because pixel-by-pixel FLIM analysis is "generally" advantageous, as allegedly evidenced by Siegel, it would have been obvious to apply the methods of Marcu and Maarek to that process. Applicants respectfully submit that it is impermissible hindsight to determine that one of skill in the art would have been motivated to apply the Laguerre method to a FLIM analysis, simply because FLIM was known to be an effective imaging method, especially considering that Laguerre deconvolution had only previously been applied to TRFS (a significantly different imaging technique) in the cited art. The process of conceiving of, adapting, and subsequently verifying the effectiveness of applying the Laguerre method to FLIM analysis was clearly not trivial, or obvious, considering that it had not been done in the time between the publication of the cited art and the invention of the Applicants.

With respect to claim 24, Applicants submit that the addition of Reel fails to cure the deficiencies described herein. In light of the foregoing analysis, Applicants respectfully request reconsideration and withdrawal of this rejection under § 103.

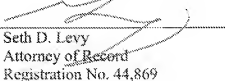
Applicants submit that the present Application is in condition for allowance and respectfully requests the same. If any issues remain, Examiner is cordially invited to contact

Applicants' representative at the number provided below in order to resolve such issues promptly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 04-0258.

Respectfully submitted,
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DAVIS WRIGHT TREMAINE LLP

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